

# *The* OPEN COURT

Devoted to the Science of Religion,  
the Religion of Science, and the Extension  
of the Religious Parliament Idea

FOUNDED BY EDWARD C. HEGELER

JANUARY, 1930

“←—————→”  
VOLUME XLIV      NUMBER 884

*Price 20 Cents*

*The Open Court Publishing Company*

Wieboldt Hall, 339 East Chicago Avenue  
Chicago, Illinois



# *The* OPEN COURT

Devoted to the Science of Religion,  
the Religion of Science, and the Extension  
of the Religious Parliament Idea

FOUNDED BY EDWARD C. HEGELER

JANUARY, 1930

—◀————▶—  
VOLUME XLIV      NUMBER 884

*Price 20 Cents*

*The Open Court Publishing Company*

Wieboldt Hall, 339 East Chicago Avenue  
Chicago, Illinois

# THE PHILOSOPHICAL REVIEW

Edited by

WILLIAM A. HAMMOND AND FRANK THILLY

Of the Sage School of Philosophy, Cornell University

January, 1930

---

Croce's Theory of Freedom.....	Gertrude C. Bussey
The Problem and Method of Epistemology.....	John B. Kent
George Keith and the Cambridge Platonists..	Marjorie Nicolson
Spinoza on God (I).....	Joseph Ratner
Discussion	
Contradiction and Error.....	Lawson P. Chambers
Reviews of Books .....	

Paul Friedländer, Platon. I: Eidos, Paideia, Dialogos: by Rupert Clendon Lodge—Julius Stenzel, Platon der Erzieher: by Glenn R. Morrow—George W. Robinson (tr.), Autobiography of Joseph Scaliger: by Harry Caplan—Hiralal Haldar, Neo-Hegelianism; George Boas, The Major Traditions of European Philosophy: by G. Watts Cunningham—Élie Halévy, The Growth of Philosophical Radicalism (tr. by Mary Morris): by H. W. Wright—F. R. Tennant, Philosophical Theology: by Rufus M. Jones.

Notes .....  
Leonard Trelawney Hobhouse.

---

Published Bi-Monthly

LONGMANS, GREEN & CO.

Lancaster, Pa.

55 Fifth Avenue, New York

Single Numbers \$1.00 (5s.)

Per Annum \$5.00 (25s.)

# THE OPEN COURT

Volume XLIV (No. 1)

JANUARY, 1930

Number 884

## TABLE OF CONTENTS

	PAGE
<i>Frontispiece.</i> GANESA. METAL FIGURE FROM PATTIAVARAM.	
<i>The Cosmic Teeth.</i> LAWRENCE PARMLY BROWN.....	1
<i>Positivism and Humanism.</i> EDWIN H. WILSON.....	21
<i>From Modern Physics to Religion.</i> VICTOR S. YARROS.....	37
<i>Religion Always Comes Back.</i> WILLIAM H. ROBERTS.....	48
<i>The Philosophy of Dr. McTaggart.</i> GILBERT T. SADLER.....	58

Published monthly by  
THE OPEN COURT PUBLISHING COMPANY

337 East Chicago Avenue  
Chicago, Illinois

*Subscription rates:* \$2.00 a year; 20c a copy. Remittances may be made by personal checks, drafts, post-office or express money orders, payable to the Open Court Publishing Company, Chicago.

While the publishers do not hold themselves responsible for manuscripts sent to them, they endeavor to use the greatest care in returning those not found available, if postage is sent. As a precaution against loss, mistakes, or delay, they request that the name and address of the author be placed at the head of every manuscript (and not on a separate slip) and that all manuscripts and correspondence concerning them be addressed to the Open Court Publishing Company and not to individuals.

Address all correspondence to the Open Court Publishing Company, 337 East Chicago Ave., Chicago.

Entered as Second-Class matter March 26, 1897, at the Post Office at Chicago, Illinois, under Act of March 3, 1879.

Copyright by The Open Court Publishing Company, 1930.  
Printed in the United States of America.

TWO FOREMOST BOOKS ON  
PHILOSOPHY  
EXPERIENCE AND NATURE

*By John Dewey*

Third and Revised Edition

This book is valuable for two main reasons:

*First:* it has produced a literature of its own in stimulating other men to express themselves in books, articles and reviews.

*Second:* it is the first volume of a series of lectures given by the American Philosophical Association on the Paul Carus Foundation.

\$3.00



OUR KNOWLEDGE OF THE EXTERNAL WORLD  
AS A FIELD FOR  
SCIENTIFIC METHOD IN PHILOSOPHY

*By Bertrand Russell*

New and Revised Edition

These eight lectures attempt to show, by means of examples, the nature, capacity, and limitations of the logico-analytical method in philosophy. They represent the final answers of modern science and mathematics to the soluble problems of metaphysics.

\$3.00



THE OPEN COURT PUBLISHING COMPANY  
Chicago London

# JOURNAL of PHILOSOPHY

This periodical is the organ of active philosophical discussion in the United States. There is no similar journal in the field of scientific philosophy. It is issued fortnightly and permits the quick publication of short contributions, prompt reviews and timely discussions.

*Edited by Professors F. J. E. Woodbridge,  
W. T. Bush, and H. W. Schneider,  
of Columbia University*

---

515 WEST 116TH STREET, NEW YORK

\$4 a Year, 26 Numbers

20 Cents a Copy

---

## NOW READY ESSAYS IN PHILOSOPHY BY SEVENTEEN DOCTORS OF PHILOSOPHY OF THE UNIVERSITY OF CHICAGO

edited by

T. V. SMITH, University of Chicago

and

W. K. WRIGHT, Dartmouth College

What has been the influence of the Chicago type of philosophy upon the community? Here critics may find a partial answer. Those not interested in this type of question will find in this volume most important questions in contemporary speculation discussed with variety of viewpoint and not without insight. A fresh and sometimes stirring treatment of the most baffling perplexities of modern life.

Cloth, \$3.50

THE OPEN COURT PUBLISHING COMPANY  
Chicago

London



# AMERICAN MATHEMATICAL SOCIETY

## COLLOQUIUM SERIES

Published in August, 1929:

**A. B. Coble**, Algebraic Geometry and Theta Functions. About 300 pp.  
\$3.00 (Volume X of the Colloquium Series.)

### EARLIER VOLUMES

Volume I. Linear Systems of Curves on Algebraic Surfaces, by **H. S. White**; Forms of Non-Euclidean Space, by **F. S. Woods**; Selected Topics in the Theory of Divergent Series and of Continued Fractions, by **E. B. Van Vleck**. (Boston Colloquium.) New York, 1905. \$2.75.

Volume II. New Haven Colloquium, by **E. H. Moore**, **E. J. Wilczynski**, and **Max Mason**. Out of print.

Volume III. Fundamental Existence Theorems, by **G. A. Bliss**; Differential-Geometric Aspects of Dynamics, by **Edward Kasner**. (Princeton Colloquium.) New York, 1913. \$2.50.

Volume IV. On Invariants and the Theory of Numbers, by **L. E. Dickson**; Topics in the Theory of Functions of Several Complex Variables, by **W. F. Osgood**. (Madison Colloquium.) New York, 1914. \$2.50.

Volume V. Functionals and their Applications. Selected Topics including Integral Equations, by **G. C. Evans**; Analysis Situs, by **Oswald Veblen**. (Cambridge Colloquium.) New York, 1918, 1922. \$3.50.

Volume VI. The Logarithmic Potential. Discontinuous Dirichlet and Neumann Problems, by **G. C. Evans**. New York, 1927. \$2.00.

Volume VII. Algebraic Arithmetic, by **E. T. Bell**. New York, 1927. \$2.50.

Volume VIII. Non-Riemannian Geometry, by **L. P. Eisenhart**. New York, 1927. \$2.50.

Volume IX. Dynamical Systems, by **G. D. Birkhoff**. New York, 1927. \$3.00.

Orders may be sent to the American Mathematical Society,  
501 West 116th Street, New York City, or to



THE OPEN COURT PUBLISHING COMPANY

337 East Chicago Avenue

Chicago, Illinois



# THE HISTORY OF MATHEMATICAL NOTATIONS

By FLORIAN CAJORI

Vol. I—*Notations in Elementary Mathematics*

Vol. II—*Notations Mainly in Higher Mathematics*

Price, Cloth, \$6.00 each

"The first volume deals with the history of notations from the days of the ancients and by nations as far apart as the Babylonians and the Aztecs, Egyptians and Chinese, Arabs, Germans, Italians and English. The second volume gives a history of the symbols that have accompanied the great advance of mathematics from the days of Newton to the present times.

"Professor Cajori's book will be indispensable to the historian of mathematics."—*The Times Literary Supplement, London.*

"The amount of research that this work represents is extraordinary and the history will be of great usefulness to mathematicians."—*Journal of the American Institute of Electrical Engineers.*

THE OPEN COURT PUBLISHING CO.

Chicago

London

---

---

## SINISM

### A STUDY OF THE EVOLUTION OF THE CHINESE WORLD-VIEW

by H. G. CREEL, Ph. D.

#### Table of Contents

#### PART ONE THE BACKGROUND OF SINISM

- I. Introduction
- II. Chinese Natural Philosophy

#### PART TWO SINISM

- III. Origins of Sinism
- IV. Confucius and Confucianism
- V. Lao Tse and Laoism
- VI. Mo Tse
- VII. Popular Religion
- VIII. Conclusion

Price, \$2.00

THE OPEN COURT PUBLISHING COMPANY

Chicago

## THE AIM OF HUMAN EXISTENCE

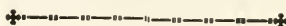
Being a System of  
Morality Based on the Harmony of Life

By Eugenio Rignano  
Editor of "Scientia"

*Reprinted from the Monist, January, 1929*

A summary of the fundamental features of a system of morals based on studies of biological and sociological synthesis.

Boards, \$1.00

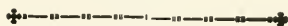


## ESSAYS IN SCIENTIFIC SYNTHESIS

By Eugenio Rignano  
*Translated by J. W. Greenstreet*

Essays appearing in English for the first time, each a study complete in itself in which the author points out the immense importance of the mathematical method in working out a theory from experimental facts from biological, psychological and sociological fields.

Cloth, \$2.00

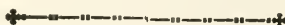


## ON THE INHERITANCE OF ACQUIRED CHARACTERS

By Eugenio Rignano

The author presents a mechanical solution of the hardest problem in Biology: Can a result influence its cause?

Cloth, \$2.00



THE OPEN COURT PUBLISHING COMPANY  
Chicago





GANESA. METAL FIGURE FROM PATTIAVARAM.  
From H. Chrishna Sastri, *South Indian Images of Gods and  
Goddesses*.

# THE OPEN COURT

A MONTHLY MAGAZINE

Devoted to the Science of Religion, the Religion of Science, and  
the Extension of the Religious Parliament Idea.

---

COPYRIGHT BY OPEN COURT PUBLISHING COMPANY 1930

---

Volume XLIV (No. 1)    JANUARY, 1930

Number 884

---

## THE COSMIC TEETH

BY LAWRENCE PARMLY BROWN

DENTAL concepts are comparatively scarce in the nature mythos, and while the majority of extant tooth-myths have been developed with much confusion and obscurity, a few will be found quite simple and transparent.

The more or less individualized flames of fire are sometimes considered teeth, as suggested by their form as well as their biting and devouring nature; and fiery teeth are sometimes allotted to the sun, which is conceived to have a burning bite, especially in the tropics. Again, the lightning flashes or thunderbolts, which burn or bite in another way, are sometimes recognized as teeth of fire. These concepts appear in some of the most transparent dental myths that have come down to us; and we shall find reasons for concluding that thunderbolts are represented by the dragon's teeth in the obscure myth of Kadmos (and in that of Jason), while the Quiche Vacub-Cakix was conceived with materialized flame-teeth in the most obscure and elaborate of all dental myths.

As the fiery teeth of the sun belong to the day, the cool night was naturally conceived by some as edentulous (toothless), which concept agrees with the ancient idea that the night is older than the day; and we shall find various night figures, human and animal, represented as both aged and edentulous, while others have the crescent moon for a single tooth, a canine, or for two canines. But in a variant view it is an invisible lunar figure that has the visible single tooth or two teeth.

### I. *The Lunar Tooth or Teeth*

In all probability the single lunar tooth (as a canine) appears in connection with the single lunar eye in the myth of the Graiai ("Gray-women") or Phorkides ("Daughters-of-Phorkys"), which has come down to us through the Greeks and Romans. The earliest extant allusion to the Graiai or Phorkides is found in the *Theogony* of Hesiod (*circ.* 725 B. C.), where it is said that the two daughters of Phorkys and Kētō were called the Graiai because they were gray (i.e., gray-haired) from their birth; one of them being "Pephrēdō, handsomely-clad," and the other "Enyō, saffron-veiled." And Hesiod adds that they were sisters of the three Gorgones, who "dwell beyond the famous ocean, in the most remote quarter nightward" (*Theog.*, 270-275). But here we have nothing of the tooth and eye.

The two gray and aged females in the original myth probably represented either the rising moon and setting moon, or that luminary as successively crescent and gibbous; in either case the dwelling place of the Graiai being the celestial sea of night rather an island in the terrestrial ocean. The names Pephrēdō (or Pemphrēdō) and Enyō (also a goddess of war, in Homer) are of very uncertain meaning; but the garment of the former probably was adorned with stars, while the saffron or yellow veil of the latter is appropriate enough for a lunar figure. Like the sun and the stars, the moon is mythically born from the eastern side of the earth-surrounding ocean of the ancients, or from some huge fish or sea-monster; and the name Kētō seems to be a feminine form of *ketos* (any large fish such as a porpoise or whale), while Phorkys is an ancient sea-god of Asia Minor, where the myth of the Graiai doubtless originated. Probably because of the familiarity of the western ocean to the Mediterranean peoples, Phorkys and Kētō are also the parents of the Hesperian dragon in the account followed by Hesiod (333), who gives the western quarter of the ocean as the dwelling place of the Gorgones.

The next extant allusion to the Phorkides (*circ.* 470 B. C.) is in the *Prometheus Bound* of Aeschylus, where they are not called Graiai (790-797). According to Aeschylus there were three of these aged sisters, whose names he does not give; and he says that they dwell with the Gorgones and other monsters across the sea, far to the east, on the plains of Kisthene (doubtless in Asia Minor,



where two places of that name were located). Aeschylus describes the Phorkides as

“.....aged maidens,  
Three, swan-shaped, possessing in common but one eye  
And one tooth,<sup>1</sup> upon whom the sun never looks  
With his rays, or the nocturnal moon.”

The three Phorkides of Aeschylus and later writers appear to represent the three forms of the moon recognized by the ancients as belonging to the eastern, the central (overhead) and the western divisions of its path through the heaven; the sun also sometimes being given three forms in these stations (See the present writer's "*Cosmic Transmutations*," in the *Open Court*, Vol. XXXIV, p. 293). Again, some personifications of the night and the day, as well as solar and lunar figures, have three eyes, or three heads, or three faces; and thus while the Hindu moon-god Chandra has three eyes, Horace (*Carm.* III, xxii, 4) and Ovid (*Met.* VII, 94) speak of "*Diana triformis*," and Ausonius says that "virgin Diana has three faces" (*Griphus Tcnarii Numeri*, 18).

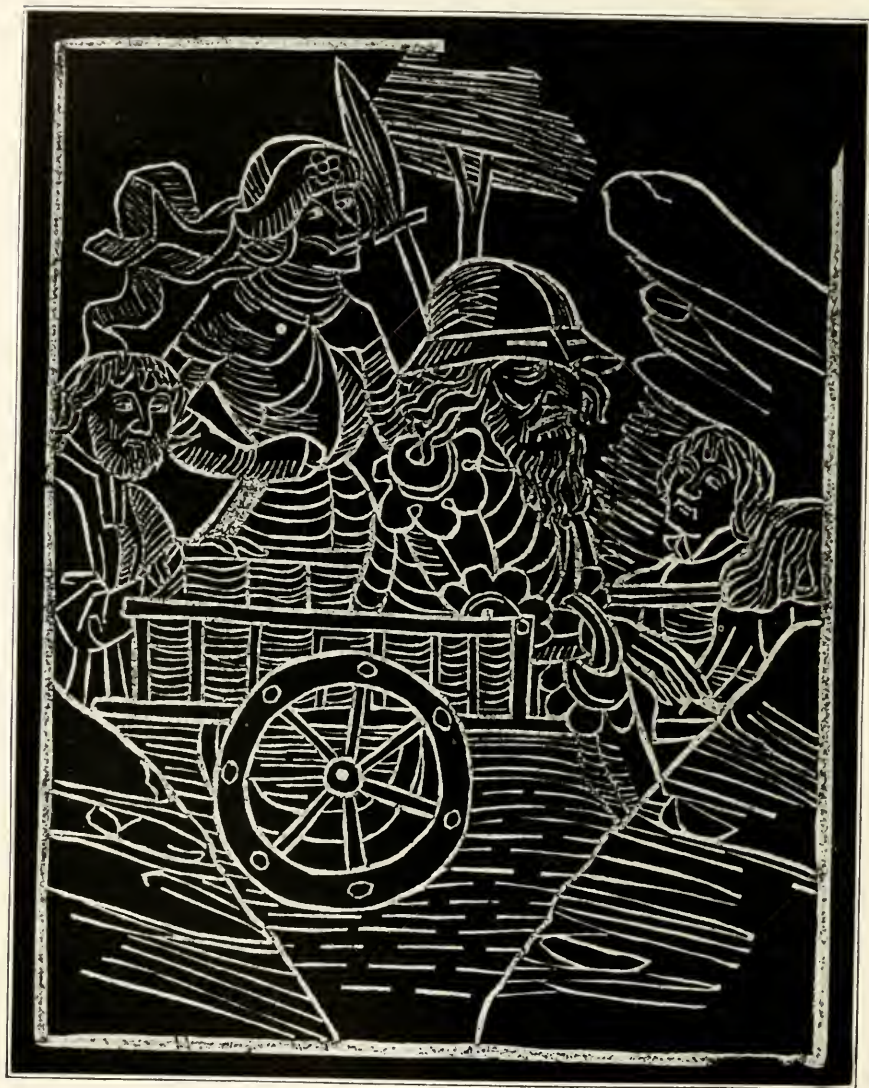
The primary suggestion for the swan-shape of the Phorkides in Aeschylus is probably found in a fanciful resemblance of the curved neck of the swan to the crescent moon and the bent body of aged persons: and swans are also gray or white and swim on the terrestrial waters, as the gray-haired Phorkides in one view float on the celestial sea. The statement that neither the sun or moon ever look upon the Phorkides appears to have been derived from some lost myth according to which these lunar figures dwelt in the depths of the celestial sea of night, which some erroneously supposed to be the terrestrial sea where Phorkys dwelt on the coast of Asia Minor.

The further elaboration of the myth is thus set forth by Apollodorus (first or second century A. D.), who gives Deinō as the name of the third sister: "The three had but one eye and one tooth, and these they passed each to the other in turn. Perseus took possession of their eye and tooth, which they asked him to return; but

<sup>1</sup> There is no apparent connection between the lunar single tooth, the *monodous* of Aeschylus, and the several *monodonta* or one-toothed individuals mentioned by ancient authors, such as Pyrrhus, king of Epirus (Plutarch, *Vit. Pyr.* 4), and a son of Prusius II of Bithynia (Pliny, *H. N.*, VII, 16). They probably had teeth that appeared to form a single bone in one jaw or both jaws, these teeth perhaps being of square form, close set and partially worn down, and perhaps also encrusted with tartar.



he said he would not unless they showed him the way to the nymphs"; and when they had done that, he returned the tooth and the eye (*Bibliothèque*, II, iv. 2). Perseus is generally recognized



GEOFFROY WITH THE GREAT TOOTH.

From a Spanish version of the *History of Melusine*, 1489, in the British Museum).

as a solar figure, and his seizure of the eye and tooth perhaps relates to the monthly disappearance and return of the moon; but according to Hyginus (*Poet. Astr.* II, 12), Perseus cast both eye and tooth into Lake Triton, which seems to be put for the western ocean into which the moon goes daily. In the true mythic view, however, the lunar tooth and eye do not exist at the same time, and therefore both could not have been seized by Perseus. This may have been recognized by Ovid, who speaks of the eye alone as used by the two daughters of Phorcys (Phorkys) and stolen by Perseus when one of the sisters was handing it to the other, the supposition evidently being that neither then could see (*Met.* IV, 764-766). The scene is engraved on an Etruscan bronze mirror from Palestrina, where we have the only generally recognized ancient representation of the Graiai, two of whom are there shown and named in a group with Perseus and Minerva. According to the *Bulletin Épigraphique* (1884) this representation shows Enie (Enyō) with an eye in one hand and a mirror in the other, while Pherse (Perseus) puts forth his right hand to seize the eye, "at the same time taking possession of the tooth which Pemphetru (Pemphrêdō or Pephreōdō) presents to him" (Vol. IV, p. 152); but it is possible that only the eye is figured on this Etruscan mirror. In a copy of it published in the *Monumenti Inediti: Istituto di Corrispondenza Archeologica* (1873, Vol. IX, plate 56, No. 2), the tooth does not appear, and even the eye is somewhat uncertain; but it is there according to the description in the *Annales* of the Institute (Vol. XLV, p. 127)<sup>2</sup>.

In classic mythology the lunar tooth appears to be found only in the Graiai myth; but there are reasons for suspecting that the single large protruding canine of Geoffroy of the Great Tooth originally represented the crescent moon, while his mother, Melusine

<sup>2</sup> Further information regarding the Graiai and Gorgones will be found in the long articles devoted to them in Roscher's *Ausführliches Lexicon der Griechischen und Römischen Mythologie*, where we learn that the Graiai are generally interpreted by modern scholars as gray clouds, with their tooth as the lightning and their eye as the sun or moon, while the Gorgones are often recognized as storm figures. But it is not improbable that the Gorgones (females) as well as the Graiai were originally lunar; for while the later Greeks and Romans speak of three Gorgones, Homer knew only one Gorgo, whose frightful head was figured on the aegis of Athena (*Illiad*, V, 741, etc.) and an Orphic poem referred to the moon as Gorgonian, "because of the face in it" (Clemens Alexandrinus, *Strom.*, V, 8). It therefore seems that the four huge canine teeth of the more ancient Gorgon faces were depicted simply to enhance their frightfulness, while the original Gorgon head represented the full or gibbous moon with the face in it.

of Lusignan, had the character of the underworld sea-monster who gives birth to the moon. Their fabulous story is set forth in the old French *Histoire de Melusine* (fourteenth century), according to which Melusine was changed periodically into a creature half fish and half woman, while Geoffroy was born with his great tooth, just as the Graiai were born gray (and the moon is born each month with its single tooth). In the early English translation of the *Histoire de Melusine* (circ. 1500), Geffray (Geoffroy) is described as a man "which at his birth brought in his mouthe a grete and long toth, that apyered without [i.e., protruding from his mouth] an ench long and more, and therefore men added to his propre name Geffray with the grete toth" (Ch. XIX, fol. 61). It is probable that the epithet originated in a misunderstanding of some colloquial phrase designating this redoubtable and ruthless warrior as figuratively "long-toothed" (i.e., having extraordinary destructive or biting power); and the same may be said of most of the other warriors who are declared to have been born with teeth, such as M. Curius Dentatus (Pliny, *H. N.*, VII, 16), for the cognomen Dentatus means simply "Toothed." But human beings are occasionally born with a tooth or teeth.

One of the most ancient and wide-spread concepts of mythology is that of the crescent moon as the two united horns of an invisible animal, and we still speak of the horns of the crescent moon; but it seems that these horns were conceived by some as two teeth. In Egyptian mythology there are "two divine envoys" (perhaps for the sun and moon), the name of one of them being Betti, "He of the two teeth (or two horns)," according to Budge (*Book of the Dead*, Theban Recension, XXXI, 3). An elaborately ornamented moon amulet which the modern Jew of Palestine hangs about the neck of his horse consists of the two tusks of a wild boar so mounted that their points represent the horns of the crescent moon (S. Seligmann, 1910, *Der böse Blick und Verwandtes*, p. 116).<sup>3</sup>

<sup>3</sup> The moon is invoked in many European toothache charms, with various applications of the number three (L. Kanner, 1928, *Folklore of the Teeth*, pp. 155-157). To insure healthy dental organs; the Ukrainians stop at the first sight of each new moon, pray three paternosters and spit three times backward over the left shoulder; and others suppose that he who first sees the new moon will have a set of healthy teeth (*ibid.*, p. 67). This association of healthy teeth with the new moon doubtless originated in the ancient belief that all things grow or increase while the moon waxes and decrease or decay while it wanes, whence a German cure for toothache and other pains is to look toward the waning moon and say, "As the moon decreases, so may my pains decrease also." (J. G. Frazer, *Adonis, Attis, Osiris*, Ch. IX, ed. 1907, p. 377).

Some of the Greeks, Romans, Hebrews and others, who knew little of the elephant, referred to its tusks as horns; and while there seems to be no evidence that any one-horned animal (monoceros or unicorn) had a lunar character, we do find one of the two tusks (upper central teeth) of an elephant broken off, leaving the animal with a single tusk, in the case of the Hindu Ganesa, who appears to have been a figure of the moon-lit night with his remaining tusk for the lunar crescent. Thus Ganesa ("Lord of the host of Ganas," inferior divinities, perhaps originally stars) is conceived as a short fat man of yellow color, with the head of an elephant, one of his tusks being broken off close to his mouth, whence he is called Eka-danta or Eka-danshtra ("Single tusked"). He is sometimes represented with three eyes (for the gibbous moon in its three stations), and sometimes also with four or more arms (for the cardinal points or quarters of the universe). He is the Hindu God of Wisdom (as probably suggested by the ancient Oriental belief in the influence of the moon on the minds of men and beasts); and he is generally considered a son of Siva, but there is some reason for supposing that the two gods were originally identical. Thus Siva was sometimes represented with three eyes, which serve to identify him with the moon-lit night; and he is called Ganesa in the ancient *Mahabharata* (Ganesa the God of Wisdom being mentioned only in the Introduction, a comparatively late addition to this work).

In the *Puranas* and other later Hindu books we find several variant and highly fanciful accounts of how Ganesa obtained his elephant-head and how one of his tusks was broken—the left one according to some legends and representations, but the right, according to others. In the *Siva Purana* it is said that the missing tusk had been broken off before the elephant-head had been put in the place of the original human head of Ganesa; but according to the generally received legend (as in the *Brahma Vaivārtha Purana*), Parasu-rama broke off the tusk with his ax when he forcibly entered the apartment of the sleeping Siva (for the night sky), which was guarded by Ganesa (here seemingly for the moon).<sup>4</sup>

The so-called white elephant (which is really yellow, like Ganesa) was recognized as a symbol of wisdom by the Buddhists, some of

<sup>4</sup> For lengthy considerations of the Ganesa legends and many illustrations of the god, see T. A. Gopinatha Rao, 1914, *Elements of Hindu Iconography*, Vol. I, Part I, pp. 35-67, and H. K. Sastri, 1916, *South Indian Images of Gods and Goddesses*, pp. 165-174.



whom taught that Gautama Buddha descended from heaven in the form of a white elephant, with six tusks, to be born of the virgin Maya (*Buddha-karita of Asvaghosha*, I, 20, in *Sacred Books of the East*, Vol. XLIX). Among the Siamese Buddhists this fabulous animal is known as "the king of elephants" and "the elephant of six defenses," who is named Chatthan or Chaddanta; the shores of a lake of the same name in the Himalayas being his reputed dwelling place (E. Young, 1898, *Kingdom of the Yellow Robe*, p. 396). In view of the probable lunar character of this elephant, it is a plausible conjecture that his six tusks originally belonged to the six divisions or stations of the whole zodiac path, three of which are above and three below the earth at any one time.

The tusks of elephants, boars and other animals grow continually in length and thickness, while the waxing moon (in its first quarter a tooth or two teeth) grows in thickness only. Moreover, it was generally held by the ancients (including Aristotle, *De Gen. An.*, II, 6) that a human being's teeth continue to grow during his whole life (an erroneous belief, first opposed by the anatomist Eustachius in the sixteenth century, *Libellus de Dentibus*, cap. xxiii); and it is not improbable that in the growth of the lunar teeth we have the original suggestion for an old Jewish legend of the Biblical Og, King of Bashan. According to the *Talmud*, the gigantic Og (as a lunar figure?) tore up a great mountain (for the night sky?) and carried it on his head, intending to throw it on the camp of the Israelites; but God caused certain insects (for the stars?) to dig into this mountain, so it fell about Og's neck, and at the same time his teeth on both sides of his jaw became "distended" or enlarged to such an extent that he could not throw off the mountain and consequently was shortly slain by Moses (as a solar figure?). In confirmation of this account, it was taught that *shibarta* ("break") should be read *shirbabta* ("distend") in Psalm III, 8, "The teeth of the wicked dost thou [God] break" (*Berakoth*, fol. 54b; the same revised reading appearing in *Sota*, 12b, and *Megillah*, 15b. For a slightly different version of the Og legend, see *Targum Ben-Uzziel* on Numbers XXI, 33, and compare S. Baring-Gould, *Legends of Patriarchs and Prophets*, XXII, 12).

Tooth symbolism had an important place in the mythology of the native races of Mexico and Central America, who represented many of their deities with teeth, or clearly indicated the partially

or wholly edentulous condition of old age by the manner of picturing the mouth.

It is probable that the Mexicans originally indicated the wholly edentulous condition of their aged deities by a marked contraction of the corner of the mouth (with the face in profile); this contraction in extant pictures often having the appearance of a short rounded tooth projecting from the upper jaw, as in a figure of the moon god Tecciztecatl in the *Codex Fejérváry-Mayer*, sheet 24, and in numerous figures of other aged deities (see especially E. Selar's *Codex Vaticanus B*, Elucidation, p. 70, fig. 256; p. 190, fig. 397, etc.). In fact, some of the later Mexican and Maya artists seem to have supposed that a tooth was intended, and therefore pictured one instead of the mouth contraction. Thus in the *Codex Vaticanus B* we find Tecciztecatl as an old, bent and white-haired



THE MAYA GOD D.  
(*Dresden Codex*, sheet 46).



THE MEXICAN MOON-GOD  
TECCIZTECATL.  
(*Codex Fejérváry-Mayer*,  
sheet 24).

man who rises with difficulty from his chair; and he seems to have a tusk-like upper tooth at the corner of his mouth, the face being in profile (sheet 54; compare sheet 30).

The Mexican Tecciztecatl equates with the Maya God D of the alphabetical pantheon of Paul Schellhas. God D is generally represented with a prominent aquiline nose, perhaps originally for the

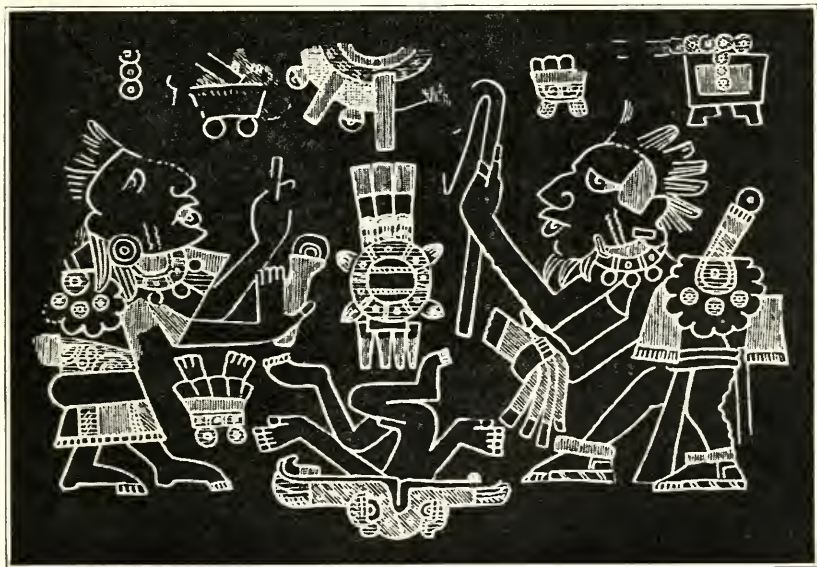
gibbous moon. His name is not definitely known, but Schellhas calls him "the Moon-and Night-God" and describes him as generally "pictured in the form of an old man with an aged face and sunken toothless mouth," who frequently appears with a head ornament in which is the sign *akbal* ("darkness," "night"). This sign also appears in his hieroglyph, placed in front of his head and surrounded by dots for stars; and "his head appears in reduced cursive form as a sign of the moon." (Schellhas, "Representations of Deities of the Maya Manuscripts," in *Papers of the Peabody Museum*, 1904, Vol. IV, No. 1, p. 22). According to H. J. Spinden, in a lengthy account of God D, "The corners of his mouth are drawn back and surrounded by deep wrinkles. Sometimes a single tooth projects forward from the front part of the upper jaw [with the face in profile], and when this is absent a stub tooth may appear in the lower jaw. But as often as not both jaws are toothless" (*A Study of Maya Art; Memoirs of the Peabody Museum*, 1913, Vol. VI, p. 69).

It is quite probable that the lower "stub tooth" resulted from a misunderstanding of some of the crude representations of lip contraction; but no such origin can reasonably be assumed for the projecting upper front tooth. Spinden refers to the latter as "a peculiar terraced tooth that is commonly described as filed" (*Ib.*, p. 72), and a similar tooth is sometimes given to God L, "the Old Black God," and to God M, "the Black God with the Red Lips," and to Goddess O, "with the features of an old woman"—all three being edentulous (Schellhas, *op. cit.*, pp. 35, 38). This "terraced tooth" is figured with some variation of form, and may represent a conventionalized compromise between the lunar crescent and an upper incisor tooth as viewed in profile. (See accompanying illustrations).

In the Mexican *Codex Borgia* the aged deities are edentulous with the exception of a very curious U-shaped or staple-like object of large size projecting downward from the front of the upper jaw. It is given to a moon goddess on sheet 65, No. 6; to the goddess Xochiquetzal, the divine mother, on sheet 9; to Tonacateculti ("Lord-of-our-subsistence"), probably the heaven-father, on sheets 9 and 61, and to a god and goddess, perhaps the celestial father and mother, on sheet 60. L. Spence refers to this staple-like object as a "gobber tooth" (*Gods of Mexico*, pp. 147-308). E. Seler calls



it "a ring-shaped appendage," and says it "is probably a mistaken formation arising from the contracted corners of the mouth of old



MEXICAN DEITIES WITH THE U-TOOTH.

(*Codex Borgia*, sheets 55 and 60).

gods, and in any case in this manuscript is characteristic of old gods" (*Vaticanus B*, p. 130). It is certainly employed in the *Codex Borgia* instead of the mouth contraction which becomes a tooth in other codexes. But nevertheless its large size indicates that it was not originally a tooth, and its peculiar shape suggests that it originally represented the visible ridge of an old person's edentulous upper jaw. Furthermore, it is not impossible that it was secondarily intended as a symbol of the crescent moon, being attached to the upper jaw because the moon is naturally associated with the heaven above.

The crescent moon as an edentulous mandible (lower jaw) quite probably suggested the jaw-bone of an ass which Samson (primarily a solar figure) used as the weapon with which he slew a thousand Philistines, according to the punning account in Judges XV, 15-19. After the slaughter, Samson cast away the jaw-bone in a place that was known, probably from its shape, as the Hill of the Jaw-bone (Ramath-Lehi): and water came out of a hollow place in the hill, corresponding to an empty tooth-socket in the jaw-bone; whereupon Samson drank and was revived. The Septuagint and English translations make the water come from a tooth socket in the jaw-bone (from a molar tooth, according to the Vulgate), which seems to be in accordance with the original mythic concept of the jaw-bone as the lunar crescent, for the moon was often supposed to be the source of dew and rain. De Gubernatis (*Zoological Mythology*, Vol. I, pp. 303-305) compares the Biblical account with the Hindu myth of the slaying of the Vritras (storm figures) by Indra (the sun) with the bones of a horse's head that had belonged to Dadhyach; but practically nothing is known of this obscure myth.

It is also quite probable that the crescent moon was the original mandible of the Japanese Agonashi-Jizo ("Jizo-who-has-no-jaw"), to whom the Buddhists of the Oki Islands pray for the cure of toothache. They had a statue of him without a lower jaw, but it was destroyed when his shrine was burned, and they say that in one of his incarnations he had such a violent toothache in his lower jaw, that he tore it off and threw it away and died. The people of Izumo, on the island of Nippon, also pray to him for the cure of toothache, and when cured go to the sea, a river or any running stream and drop into the water twelve pearls (*nashi*), one for each of the twelve months; believing that the current carries these pearls to Oki across

the sea and that in some mysterious way toothache is thus prevented throughout the year—in connection with which folk-custom we must remember that teeth have been compared to pearls from the most ancient times (See Lafcadio Hearn's delightful *Glimpses of Unfamiliar Japan*, 1895, Vol. II, ch. xxii, pp. 594, 595).

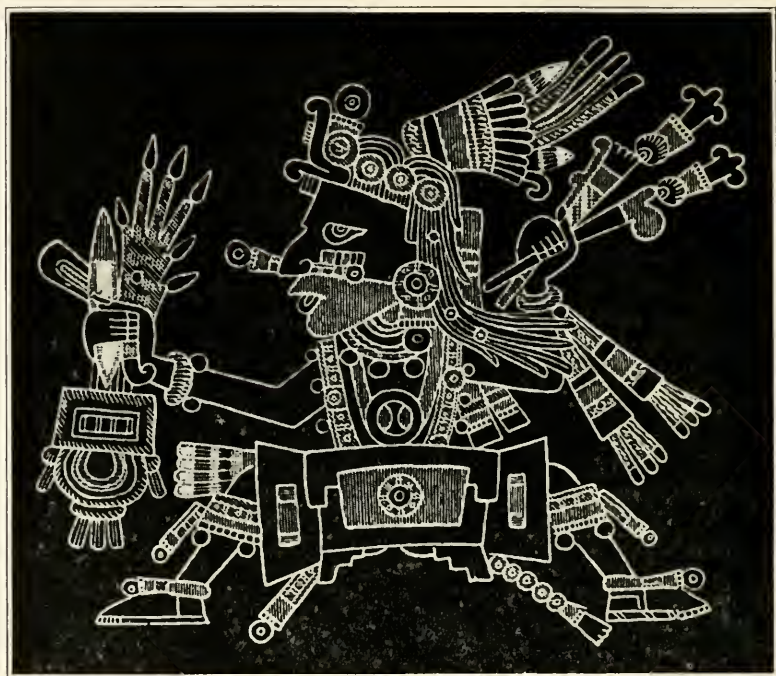
It is generally held that the name Agonashi-Jizo is a popular corruption of Agonaoshi-Jizo ("Jizo-the-healer-of-jaws"); but it is more probable that the god was anciently represented to have torn off his (lunar) jaw because he suffered from toothache and thus came to be invoked for the cure of that malady.

This myth and the epithet Agonashi appear to be peculiar to the Oki Islands and Izumo; but Jizo is one of the most popular Buddhist deities everywhere in Japan, and altogether a rather mysterious figure. His Sanskrit name is said to be Kshingarbha, which means "Born-on-earth" (as an incarnate Buddha). He is the compassionate helper of all in trouble but especially of pregnant women, of children and of travelers; and he is the protector of the souls of children in the place to which they go. As he has no close counterpart elsewhere among the Buddhists, it is a plausible conjecture that he was known to the Japanese in pre-Buddhist times; and it is not impossible that he was originally a moon-god, the helper of travelers at night, and of pregnant women at all times—for the gestation period is often supposed to be regulated by the moon. Hearn speaks of "the white Jizo-Sama," and describes a Japanese painting in which "Jizo comes, all light and sweetness, with a glory moving behind him like a great full moon" (*Op. cit.*, Ch. iii, Vol. I, pp. 51, 56).

Possibly the concept of the jawless Jizo, if not the god himself, was derived from the early Malay settlers in southern Japan, for a similar jawless god seems to have been known in ancient Java. J. Crawford (*History of the Indian Archipelago*, 1820, Vol. II, p. 202) tells us that "a monstrous face, without a lower jaw," was sculptured on all the most conspicuous parts of the temples of hewn stone at Brambanan and elsewhere in Java, where the natives stated that it represented Siva—with whom Buddha was identified by the Javanese.<sup>5</sup>

<sup>5</sup> A head without a lower jaw appears frequently in the Maya codices. E. Forstemann says: "I consider it the sign for fast-days" ("Comment on the Maya Dresden Manuscript," in *Papers of the Peabody Museum*, 1906, Vol. IV, No. 2, p. 109).

In the Hindu *Ramayana* (VII, 28) it is said of the macrocosmic Purusha ("Man"), whose body is the material universe, that "the divisions of time are on his teeth"; while the sun and moon are his eyes, the sky is his body, the ocean is his belly, certain mountains are his bones, etc. The text is obscure and vague, with details that seem to be somewhat inconsistent; but the divisions of time are actually marked in the heavens on the zodiac band alone; those of the year on the solar zodiac and those of the month on the lunar variant



THE MEXICAN TONACATECULTI WITH THE U-TOOTH.  
(*Codex Borgia*, sheet 61).

—the latter generally being recognized as more ancient than the former.

The original lunar zodiac of south-western Asia was sometimes divided into 30, sometimes into 31 houses (R. Brown, *Primitive Constellations*, II, pp. 4, 60, etc.), probably as a compromise between the true lunar month of  $29\frac{1}{2}$  days and the soli-lunar month of 30



or 30½ days. But the Hindus, and also the Arabs and Chinese, had only 28 houses in their lunar zodiac, no doubt originally for a month of 4 weeks of 7 days each (H. T. Colebrooke, in *Asiatic Researches*, Vol. IX, p. 330 *sq.*). And as there are 28 human teeth in the permanent set without the late-coming wisdom teeth (32 with them, but sometimes 30 without two of them in one jaw or the other, generally the upper), we may reasonably conclude that the teeth of the macrocosmic man in the *Ramayana* belong to the lunar zodiac, with one tooth for each of the daily phases of the moon. This seems to require a human figure with wide open mouth and the zodiac band on the circle of teeth.

Half the zodiac is always beneath the earth; and in the *Bhagavat Purana*, where the macrocosmic figure is a porpoise, the upper jaw is allotted to Agastya (identified with the star Canopus), while the lower jaw is allotted to Yama, the god of the underworld (See translation of Sir W. Jones, in *Asiatic Researches*, Vol. II, p. 402). Thus in one view the palate of the cosmic figure corresponds to the northern celestial hemisphere, for the north is always considered the top of the sphere; and the roof of the mouth (Latin *palatum*, from its resemblance to a shovel, *pala*) is in Greek *ouranos*, a vault, originally for the vault of the heaven, while Ennius even calls the celestial vault "the palate of heaven (*coeli palatum*)," according to Cicero (*De Nat. Deor.*, II, 18). In the *Vishnu Purana* (II, 12) the two jaws of the macrocosmic porpoise, for unknown reasons, are identified with different gods. But nothing is anywhere said about the teeth of this porpoise, perhaps because the real porpoise has 80 to 96 teeth.

Some of the Egyptians seem to have conceived the macrocosmic animal as a crocodile; for Horapollo says the sunrise was represented in Egypt by the eye of a crocodile, "because it is first seen as that animal rises out of the water" (*Hieroglyph*, I, 65), and according to Achilles Tatius in his romance of *Leukippe and Kleitophon*, the teeth of the crocodile "are said to be identical in number with the days to which God gives light during a year" (IV, IX). But the common varieties of African and Asiatic crocodiles have 66 teeth, 36 above and 30 below, and Aelian (*De An. Nat.* X, 21) connects

the number 60 with the Egyptian crocodile in various ways, stating that it has 60 teeth, 60 vertebrae, etc. Aristotle says that all snakes "have as many ribs as there are days in a month; namely, thirty" (*De Part. An.*, III, 1); but the ribs of snakes are far more numerous and vary in different species, some of which have as many as 300 pairs—whence it is possible that the original statement related to 360 or 365 ribs as identical in number with the days of a year. Some of the medieval anatomists held that there are 365 veins in the human body (*Regimen Sanitatis Salernitanum*, lxxxvi, etc.).

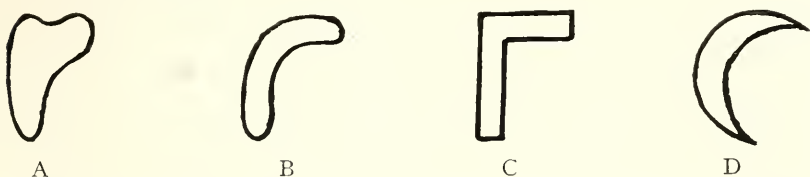
Some of the ancients assigned  $10 \times 7 = 70$  years to the normal span of human life (the Biblical "three score and ten years"); the second septenary of that span sometimes being recognized as marked by the eruption of the second or permanent teeth (with the exception of the late-coming wisdom teeth), while the seventh month was accepted for the appearance of the earliest teeth of the temporary or first set (the "milk teeth"): And it was also recognized that the 28 permanent teeth comprise an upper and lower set of 14 each, and are divided by the median line of the face into 4 groups of 7, each of which corresponds in number to the days of a week.

The eruption periods of the temporary and permanent teeth are given with approximate correctness in *De Carnibus* (one of the Hippocratic monographs, in Kühn's edition of Hippocrates, Vol. I, p. 252), where it is stated that the first teeth begin to appear in the seventh month, and (begin to) fall out at the end of seven years; their successors appearing between the ages of seven and fourteen, in which interval also appear the first of the large teeth (our first and second molars), being followed by the wisdom teeth in the fourth septenary (i.e., between the ages of 21 and 28). Aristotle also says that children begin to cut their teeth in the seventh month (*Hist. An.*, VII, 10). But Solon (*circ.* 575 B. C.) erroneously stated that the child produces and casts forth its first teeth during its first seven years (in Clemens Alexandrinus, *Strom.*, VI, 16); Pliny has it that the first teeth are produced in the seventh month and shed about the seventh year (*H. N.*, VII, 37), and similar erroneous statements reappear continually in later writers.

Aulus Gellius has preserved the following erroneous statements from the lost *Hebdomades* of Marcus Varro, the most learned of the Romans (first century B. C.): "The teeth, too," he says, "come forth in the first seven months, seven in each part [*septenos ex*

*utraque parte*; i.e., seven in each half of each jaw<sup>6</sup>], and fall out in seven years; and the cheek-teeth [our first and second molars] are added, as a rule, in twice seven years" (*Noct. Attic.*, III, X, 12).

Varro's statement to the effect that the temporary teeth comprise seven in each half of each jaw, indicates that some of the ancients supposed that children had the same number of teeth as adults (this number being the lunar  $4 \times 7 = 28$ , whereas the actual number of the temporary teeth is only 20). And in Europe during the first Christian millenium there seems to have been a widely accepted belief that children as well as adults had 28, 30 or 32 teeth, so when the true number of the temporary teeth began to be recognized, it was fabled that they had been suddenly reduced, more or less miraculously.



TWO VARIANT FORMS OF THE MAYA "TERRACED TOOTH" (B. C.) COMPARED WITH THE CROWN OF A HUMAN UPPER CENTRAL INCISOR, SIDE VIEW (A), AND THE CRESCENT MOON (D). FORM B IS FROM THE *DRESDEN CODEX*, SHEET 46, AND FORM C IS FROM SPINDEN, *MAYA ART*, P. 72, FIG. 91.

According to the French historian Rigord (thirteenth century), all children born after the capture of the cross of Christ by Saladin in 1187 had only 20 or 22 teeth, whereas they had 30 or 32 before that event (*Gesta Philippi Augusti*, ch. LV, trans. by Delaborde, *Oeuvres de Rigord*, I, pp. 82-83). Later writers state that the reduction occurred immediately after the great pestilence or Black Death midway in the fourteenth century, and was caused by it; this reduction, according to some, being from 32 to 22 or 20 (*Continuatio Chronici Guillelmi de Nangiaco* [Guillaume de Nangis], *circ.* 1360, edition Geraud, II, p. 217; D'Achery, *Spicilegium*, 1653-1677, edition De la Barre, III, p. 110. See also J. F. C. Hecker, *The*

<sup>6</sup> W. Beloe, 1795, translates: "The teeth, also, seven above and seven below, are produced in the first seven months"; and the rendering of J. C. Rolfe in Loeb's *Classical Library*, is even worse: "seven at a time in each jaw."



*Black Death*, Babington's trans., IV, p. 21). Others, including the physician Savonarola (1560, *Practica Major*, VI, vii, 1, p. 106) put the reduction from 32 to 22 or 24; the last number being correct for children between the ages of 6 and 12, when the 4 permanent first molars are found in connection with the 20 temporary teeth, or some of them and some of their successors. But according to *The Brut or The Chronicles of England*, 1480, ch. xxviii (translated from the French *Brut d'Angleterre*), children born after the great pestilence had two cheek-teeth less than they had before—doubtless an error for two cheek-teeth less in each half of each jaw, with the normal number of permanent teeth recognized as  $4 \times 7 = 28$ .

It is quite probable that the allotment of the moon-teeth to the twenty-eight houses of the lunar zodiac suggested a lost Assyrian myth which in turn suggested one of the obscure statements in one of the extant Izdubar Tablets, translated by H. F. Talbot ("Ishtar and Izdubar, being the Sixth Tablet of the Izdubar Series," in *Records of the Past*, 1877, First Series, Vol. IX, *Assyrian Texts*, p. 119). There can be no doubt that Ishtar and Izdubar were originally lunar and solar respectively; but in these tablets, as elsewhere, Ishtar is conceived as the goddess of night and more than the moon, though still with lunar characteristics; and the Izdubar Tablets give us a comparatively late poetical romance based on a very ancient mythological legend. On Tablet VI, Ishtar is conceived as the queen of witchcraft, who has perpetrated seven acts of cruelty and treachery on men and beasts; the allusion to one of these acts being as follows (in Talbot's translation):

Thou hadst a favorite lion, full of vigour:  
thou didst pull out his teeth, seven at a time."

As a lion has thirty permanent teeth (16 above and 14 below), it is a plausible conjecture that he was supposed by some to have  $2 \times 14$  or  $4 \times 7$  (or 28 in all), which suggests that the above-quoted allusion is to some mythological legend containing a statement to the effect that the teeth of Ishtar's lion were arranged seven on a side, above and below, and that  $4 \times 7 = 28$  teeth were extracted. Therefore, with Ishtar recognized as the night-goddess, we may conclude that her harmless lion was originally a solar figure (like the human-headed lion of Assyria), and that he was recognized by some as the macrocosmic animal whose teeth belong to the  $4 \times 7 = 28$  days of a

lunar month, with one tooth for each of the daily phases of the moon.

There is also an old English story according to which King John succeedd in forcing a Jew of Bristol to part with a large sum of money only after seven of the Jew's molar teeth had been knocked out, one a day for seven days (Roger of Wendover, *Flores Historiarum*, ad An. 1210, and others following him).

Saint Apollonia ("Of Apollo"), to whom for a thousand years or more prayers have been offered for the cure of toothache, is said to have had all her teeth knocked out as the distinctive feature of her martyrdom (Eusebius, *Hist. Eccl.*, II, xxxiv); and according to one of the later forms of her legend (in the Bollandist *Acta Sanctorum*, Feb. 9; see also W. Bruck, *Das Martyrium der Heiligen Apollonia*, p. 12), her name was originally Dina (for Diana, the Roman moon-goddess), while that of her father was Apollonius (for Apollōn or Apollo, the sun-god). Indeed it is not impossible Eusebius describes Apollonia as an aged virgin of Alexandria, while that the original story was suggested by some lost moon-myth; for Artemis-Diana is a virgin, and various lunar figures are bent and white with age.

According to the Gospel of John, xviii, 22, a certain Jew struck Jesus with the palm of his hand—on the cheek, as the *Sinaitic Palimpsest*, *Syriac Peschito* and *Diatessaron of Tatian* have it. Popular tradition generally identifies this Jew with the Malchos of John xviii, 10; and according to a Sicilian tradition Malchos knocked out all of Christ's teeth with his iron glove, for which offense he was condemned to walk incessantly, till the day of judgment, around a column in the center of a circular room underground (G. Pitre, 1875, *Fiabe, Novelle e Racconti*, no. 120, in his *Biblioteca della Tradizioni popolari Siciliane*; followed by T. F. Crane, 1889, *Italian Popular Tales*, no. 57, p.196). It is not improbable that the circular path around a column originally represented the zodiac with the pole of the ecliptic at its center; in connection with which there is a further probability that Jesus was identified with some lunar figure whose teeth were knocked out by a personification of the storm. This conjecture is supported to some extent by a Venetian variant tradition, according to which the Virgin Mary (for the moon as feminine?) has her teeth knocked out by Malchos (D. G. Bernoni, 1874, *Preghiere popolari Veneziane*, p. 18).

Jesus is generally assumed to have lived about  $31\frac{1}{4}$  years according to the Synoptic Gospels, or about  $33\frac{1}{4}$  years according to John; a naturally suggested compromise between these extremes being 32 years, corresponding to the full normal number of a human being's permanent teeth. And in Hungary a sufferer from toothache forms around him a circle of 32 birthwort flowers, each of which he chews and spits out in turn, and then says: "Christ was thirty-two years old when he died; I have thirty-two teeth, and have gnawed thirty-two flowers," etc. (H. von Wlislocki, 1893, *Aus dem Volksleben Magyarén*, p. 128).